



AFS2

ABOUT AUTO EMISSIONS

JUNE, 1977

Since January 1, 1971, the control of air pollution from motor vehicles has been a shared federal-provincial responsibility. The federal government now establishes all emission standards for new vehicles and enforces them at the manufacturer's level.

The Ontario Ministry of the Environment is responsible for the control of pollution caused by emissions from vehicles after they have been sold.

The use of gasoline as fuel for motor vehicles produces three main pollutants: hydrocarbons, nitrogen oxides and the major offender, carbon monoxide. About 90 per cent of the carbon monoxide contamination in our air is produced by exhaust from motor vehicles.

Automotive pollutants result from the incomplete combustion of fuel. Carbon monoxide is toxic to man and animals and in sufficient concentrations can be lethal. Hydrocarbons and oxides of nitrogen react together under the influence of sunlight to produce visibility-reducing oxidants (primarily ozone) which can also cause damage to vegetation. The new emission control devices aid in a more complete combustion of fuel and are thus reducing the amounts of harmful pollutants being emitted to the air.

There are five basic methods of controlling automotive exhausts.

- (1) Engine modification systems involve redesign of the engine to produce more efficient combustion and, therefore, lower concentrations of pollutants. Engines equipped with engine modification systems have carburetors of a leaner air fuel mixture. The spark timing is advanced or retarded for better combustion depending on the particular mode of vehicle operation.
- (2) The air injection reactor (A.I.R.) system uses an air pump to force air into the exhaust manifold of the car engine. The temperature of the air-exhaust gas mixture is high enough to induce more complete combustion. As a result, most of the polluting gases are burned to carbon dioxide and water vapor.
- (3) The fuel injection system accurately meters a fixed amount of fuel and air to each combustion chamber of the vehicle's engine. Better combustion can be achieved with this approach than with the carburetor system. Fuel injection cuts off the fuel supply completely during deceleration, a time when a carburetor causes high pollutant output.
- (4) The exhaust gas recirculation (E.G.R.) system diverts some of the exhaust gas back into the engine inlet system. This dilution of the air/fuel mixture reduces the peak combustion chamber temperatures which in turn reduce the production of nitrogen oxides.
- (5) Catalytic mufflers containing certain types of catalysts can be used to oxidize carbon monoxide and hydrocarbons or to reduce oxides of nitrogen. Due to the poisoning effect that lead has on the catalyst, however, the system can only be used with unleaded gasoline, gaseous fuels (eg. liquid propane) or diesel fuel.

JUL 26 1977

RECEIVED

Copyright Provisions and Restrictions on Copying:

This Ontario Ministry of the Environment work is protected by Crown copyright (unless otherwise indicated), which is held by the Queen's Printer for Ontario. It may be reproduced for non-commercial purposes if credit is given and Crown copyright is acknowledged.

It may not be reproduced, in all or in part, for any commercial purpose except under a licence from the Queen's Printer for Ontario.

For information on reproducing Government of Ontario works, please contact ServiceOntario Publications at copyright@ontario.ca

Emission control devices are wrongly thought by many people to be the main cause of reduced gas mileage in late model cars. While early devices used on 1971-72 model cars did initially cause a reduction in gas mileage, manufacturers have now developed control systems which are improving fuel economy. Contributing to a reduction in fuel economy are the "extras" such as air conditioning, power steering, brakes & windows, as well as increased car weight (to conform to federal safety regulations), reduced compression ration (to enable a vehicle to operate on regular grade gasoline) and increased engine size.

If the emission control devices are disconnected or tampered with, this interferes with the operating balance of the car -- and will decrease the gas mileage. On some vehicles equipped with an A.I.R. pollution control system, the injected air from the air pump cools the exhaust valves. If the air pump is not operating, this can result in overheating and burn-out of the exhaust valves.

If the E.G.R. system is blocked or disconnected, this can also cause higher combustion chamber temperatures, resulting in damaged engine components. On some models equipped with an automatic transmission, an inoperative E.G.R. system can result in a lack of vacuum to the control mechanism of the transmission system. This causes gear changes to occur at the wrong engine speed which rapidly ruins the transmission and could also put abnormal stress on the engine.

The vehicle emissions section of Environment Ontario's air resources branch assesses the effectiveness of the exhaust emission controls and ensures compliance with The Environmental Protection Act. Since 1971, this section has carried out an extensive auto emission inspection program and conducted spot-checks on vehicles all over the province. It operates a permanent testing facility on Castlefield Avenue in Toronto and during the summer months inspectors travel the province in two mobile vans, testing other communities. Approximately 12,000 cars are tested in this program each year.

This section also conducts experimental programs on new types of automotive control systems and provides an educational service to automotive mechanics (in the trade and at colleges) by illustrating the correct use and proper tune-up procedures of emission control equipment.